

## GROUP 2 OPERATIONAL CHECKS AND TROUBLESHOOTING

### 1. POWER TRAIN OPERATIONAL CHECKS

This procedure is designed so that the mechanic can make a quick check of the system using a minimum amount of diagnostic equipment. If you need additional information, read **Structure and function**, Group 1.

A location will be required which is level and has adequate space to complete the checks.

The engine and all other major components must be at operating temperature for some checks.

Locate system check in the left column and read completely, following the sequence from left to right. Read each check completely before performing.

At the end of each check, if no problem is found(OK), that check is complete or an additional check is needed. If problem is indicated(NOT OK), you will be given repair required and group location.


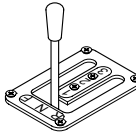
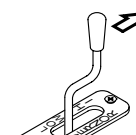
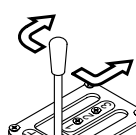
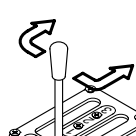

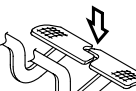
If verification is needed, you will be given next best source of information :

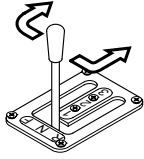
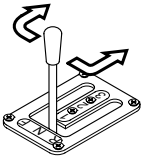
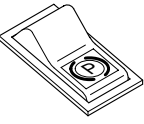
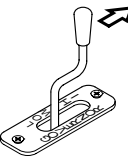
Chapter 2 : Wear limits for undercarriage components

Chapter 3 : Troubleshooting

Group 4 : Tests and adjustments

※ Transmission oil must be at operating temperature for these checks.

Item	Description	Service action
<b>Transmission oil warm-up procedure</b>	 <p>Start engine. Apply service brakes and release parking brake switch.</p> <p>Move transmission control lever to forward 3rd speed position.</p>  <p>Increase engine speed to high idle for 30 seconds by governor lever.</p> <p>Move transmission control lever to neutral "N" position and run for 15 seconds.</p>  <p>Repeat procedure until transmission temperature gauge arrow points to bar above dial.</p>	<p><b>OK</b> Check completed.</p>
<b>Transmission noise check</b> Engine running.	 <p>Run engine at approximately 1200rpm.</p> <p>Drive unit with transmission in each forward and reverse speed.</p> <p><b>LISTEN</b> : Transmission must not make excessive noise in any range.</p> <p>Engine rpm must not "lug down" as unit is shifted between gears.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> Go to transmission makes excessive noise group 3.</p>
<b>Forward, reverse and 3rd speed clutch pack drag check</b> ※ Transmission must be warmed up for this check. Engine running.	 <p>Park machine on level surface.</p> <p>Apply service brakes.</p> <p>Move transmission control lever to neutral.</p> <p>Move transmission control lever to 1st.</p>  <p>Release parking brake switch and service brakes.</p> <p>Run engine at low idle.</p> <p><b>LOOK</b> : Machine must not move in either direction.</p>  <p><b>NOTE</b> : If machine moves forward, either the forward pack or the 3rd speed pack is dragging.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> If machine moves, repair transmission.</p>

Item	Description	Service action
<b>Transmission shift modulation check</b> Engine running.	 <p>Run engine at approximately 1200rpm.</p> <p>Put transmission in 1st forward, shift several times from forward to reverse and reverse to forward. Repeat check in 2nd gear.</p> <p><b>LOOK</b> : Unit must slow down and change direction smoothly.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> Go to unit shifts too fast, chapter 2 in this group.</p>
<b>Torque converter check</b>	   <p>Start engine. Apply service brakes and release parking brake.</p> <p>Move transmission control lever to forward 3rd speed position.</p> <p>Increase engine speed to high idle.</p> <p><b>LOOK</b> : Torque converter stall rpm must be within the following range.</p> <p>Stall rpm : <math>1832 \pm 50</math>rpm</p> <p>Move transmission control lever to neutral "N" position and run for 15 seconds.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> If stall rpm are too low or too high, problem may be engine power or torque converter.</p> <p><b>IF OK</b> Replace transmission torque converter.</p>

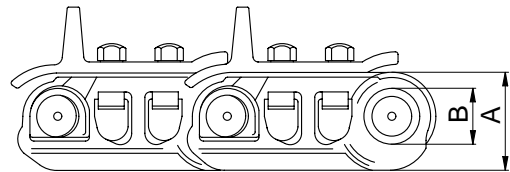
## 2. WEAR LIMITS FOR UNDERCARRIAGE COMPONENTS

### 1) TRACK CHAIN

The outer wear(B) of the bushing and the link height(A) in track chains is obtained measuring, by means of depth gauge.

With this method the radial wear is determined which is the most critical in this type of the chain. In track chains there is no internal wear between pins and bushings.

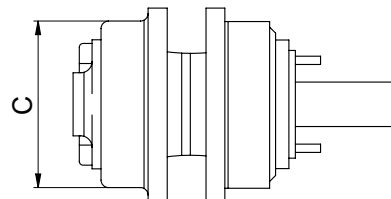
Description	New(mm)	Wear limit for reconditioning(mm)
Link height(A)	88	82
Bushing O.D(B)	50	42.5



### 2) CARRIER ROLLER

To evaluate the tread wear of the carrier roller, it is necessary to measure the diameter C with caliper in the most worn area and compare it with the new dimension shown on the wear chart.

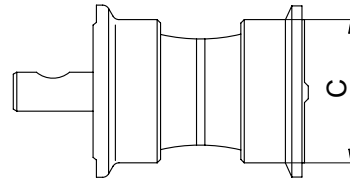
Description	New(mm)	Wear limit for reconditioning(mm)
Roller dia(C)	149	136.2



### 3) SINGLE AND DOUBLE TRACK ROLLER

To evaluate the tread wear of the track roller, it is necessary to measure the diameter C with caliper in the most worn area and compare it with the new dimension shown on the wear chart.

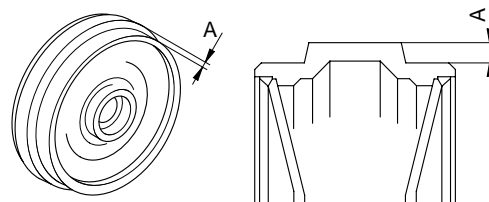
Description	New(mm)	Wear limit for reconditioning(mm)
Roller dia(C)	152	136.4



### 4) FRONT IDLER

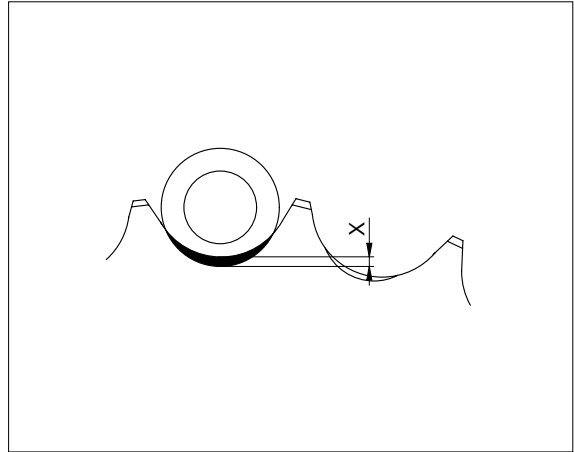
The most common wear that can be found on front idler is that of running treads in contact with the chain. To precisely measure the wear compare the height A of center flange with respect to the running tread with new dimension shown in the chart. Particular care is to be put to the conditions of the flange. If it is worn, for abnormal reasons, no valid reference will be obtained.

Description	New(mm)	Wear limit for reconditioning(mm)
Height of center frame(A)	16.5	21.0



## 5) SPROCKET TEETH

The friction of the bushing on the root of the groove cause wear, it is enhanced when sprocket diameter is large or in the case the track is too much tightened. It is necessary to rotate pins and bushings when X dimension, as indicated in the figure reaches 1/4".



### 3. TROUBLESHOOTING

#### 1) TRANSMISSION

※ Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Remember the following steps when troubleshooting a problem :

Step 1. Operational checks(In this group.)

Step 2. Troubleshooting

Step 3. Tests and/or adjustments(See group 3.)

Problem	Cause	Remedy
<b>Low clutch pressure</b>	Low oil level. Clutch pressure regulating valve stuck open. Faulty charging pump. Broken or worn clutch shaft or piston sealing rings. Clutch piston bleed valve stuck open.	Fill to proper level. Clean valve spool and housing. Replace pump. Replace sealing rings. Clean bleed valves thoroughly.
<b>Low charging pump output</b>	Low oil level. Suction screen plugged. Defective charging pump.	Fill to proper level. Clean suction pump. Replace pump.
<b>Overheating</b>	Worn oil sealing rings. Worn charging pump. Low oil level. Dirty oil cooler. Restriction in cooler lines.	Remove, disassemble, and rebuild converter assembly. Replace. Fill to proper level. Clean cooler. Change cooler lines.
<b>Noisy converter</b>	Worn charging pump. Worn or damaged bearings.	Replace. A complete disassembly will be necessary to determine what bearing is faulty.
<b>Lack of power</b>	Low engine rpm at converter stall. See <b>Overheating</b> and make same checks.	Tune engine check governor. Make corrections as explained in <b>Overheating</b> .

Problem	Cause	Remedy
<b>Torque converter stall RPM too low</b>	Low engine power. Mechanical malfunction.	Do engine power test. Remove and inspect torque converter.
<b>Torque converter stall RPM too high</b>	Aerated oil.  Stuck open converter relief valve.  Leakage in torque converter seal.  Torque converter not transferring power(Bent fins, broken starter).	Put clear hose on thermal bypass outlet port. Run machine to check for bubbles in oil.  Do converter-out pressure test.  Do converter-out pressure test.  Replace torque converter.



## 2) AXLE UNIT

Problem	Cause	Remedy
<b>Machine moves in either direction</b>	Transmission control lever not properly working.	Check contact point condition of transmission control lever.
<b>Machine moves in either direction when both steering clutches are engaged</b>	Direction clutch of transmission.	Check the direction clutch of the transmission.
<b>Slow steering</b>	Worn the clutch disc. Low engine rpm.	Inspect and repair. Adjust engine control system.
<b>Brake not engaging</b>	Worn the brake disc.	Adjust the brake.
<b>Brake not releasing</b>	Leakage the oil hose and clutch and brake system.	Inspect and repair.

## 3) DRIVE LINE

Problem	Cause	Remedy
<b>Excessive drive line vibration or noise</b>	Yokes not in line on drive shafts.	Inspect. Align drive shaft yokes.
	Worn front drive line support bearing.	Inspect, repair.
	Bent drive shaft.	Inspect all drive shafts. Replace.
	Loose yoke retaining nuts(Drive shafts wobble at high speed).	Inspect. Replace.
	Lack of lubrication.	Lubricate with proper grade of grease.